WHAT IS CLAIMED IS:

1. An electron-emitting device manufacturing apparatus for forming a surface conduction electron-emitting element by a conductive thin film, said electron-emitting device manufacturing apparatus comprising:

a discharge head of a piezo-jet type using a piezoelectric element, said discharge head having discharge opening, the diameter of which is equal to or less than ϕ 25μm, and jetting a solution that includes metal micro-particle material for forming the conductive thin film, and said discharge head jetting the solution on the area between the electrodes, which are formed on a substrate of the electron-emitting device, as a droplet and vaporizing a volatile component in a solution dot pattern after the droplet is jetted on the substrate so that a solid content is remained on the substrate,

wherein the solution having micro-particle dispersed in liquid satisfies a relationship of $0.0002 \leqq Dp/Do \leqq 0.01$ where Dp denotes a diameter of the metal micro-particle and Do denotes a diameter of the discharge opening.

2. An electron-emitting device manufacturing apparatus for forming a surface conduction electron-emitting element by a conductive thin film, said electron-emitting device manufacturing apparatus comprising:

a discharge head of a thermal-jet type using a heating element, said discharge head having a discharge opening, the diameter of which is equal to or less than ϕ 25μm, and jetting a solution that includes the metal micro-particle material for forming the conductive thin film, and said discharge head jetting the solution on the area between the electrodes, which are formed on a substrate of the electron-emitting device, at a speed between 6 m/s and 18 m/s and vaporizing a volatile component in a solution dot pattern after the droplet is jetted on the substrate so that a solid content is remained on the substrate,

wherein the solution having micro-particle dispersed in liquid satisfies a relationship of $0.0002 \leqq Dp/Do \leqq 0.01$ where Dp denotes a diameter of the metal micro-particle and Do denotes a diameter of the discharge opening.

3. The electron-emitting device manufacturing apparatus as claimed in claim 2, wherein the solution is jetted such that the solution accompanies a plurality of minute droplets during flying.

4. The electron-emitting device manufacturing apparatus as claimed in claim 2 or 3, wherein the apparatus jets the solution while moving the discharge head and the substrate relatively with a relative movement velocity equal to or less than one third of a jet velocity of the solution.

5. The electron-emitting device manufacturing apparatus as claimed in claim 1 or 2, wherein the metal micro-particle is a material softer than material that forms the discharge opening.

6. A solution including metal micro-particle material used for an electron-emitting device manufacturing apparatus that manufactures a surface conduction electron-emitting element by a conductive thin film, said electron-emitting device manufacturing apparatus having a discharge head of a piezo-jet type using a piezoelectric element, and said discharge head having discharge opening, the diameter of which is equal to or less than $\phi 25 \mu m$, and jetting a solution including the metal micro-particle material for forming the conductive thin film, and said discharge head jetting the solution on the area between the electrodes, which are formed on a substrate of the electron-emitting device, as a droplet and vaporizing a volatile component in a solution dot pattern after the droplet is jetted on the substrate so that a solid content is remained on the substrate,

wherein the solution having micro-particle dispersed in liquid satisfies a relationship of $0.0002 \leqq Dp/Do \leqq 0.01$ where Dp denotes a diameter of the metal micro-particle and Do denotes a diameter of the discharge opening.

7. A solution including metal micro-particle material used for an electron-emitting device manufacturing apparatus that manufactures a surface conduction electron-emitting element by a conductive thin film, and said electron-emitting device manufacturing apparatus having a discharge head of a thermal-jet type using a heating element, said discharge head having discharge opening, the diameter of which is equal to or less than $\phi 25 \mu m$, and jetting a solution including the metal micro-particle material for forming the conductive thin film, and said discharge head jetting the solution on the area between the electrodes, which are formed on a substrate of the electron-emitting device, at a speed between 6 m/s and 18 m/s and vaporizing a volatile component in a solution dot pattern after the droplet is jetted on the substrate so that a solid content is remained on the substrate,

wherein the solution having micro-particle dispersed in liquid satisfies a relationship of $0.0002 \leqq Dp/Do \leqq 0.01$ where Dp denotes a diameter of the metal micro-particle and Do denotes a diameter of the discharge opening.

8. The solution including metal micro-particle

material as claimed in claim 6 or 7, wherein the metal micro-particle is a material softer than member materials configuring the discharge openings.

9. An electron-emitting device comprising:

a substrate; and

a surface conduction electron-emitting element formed on the substrate by a conductive thin film, said conductive thin film is formed by jetting solution including a metal micro-particle material on the area between the electrodes, which are formed on a substrate of the electron-emitting device, and vaporizing a volatile component in a solution dot pattern after the droplet of solution is jetted on the substrate so that a solid content is remained on the substrate,

wherein a diameter of the metal micro-particle in the solution is equal to or less than a roughness of a surface of the substrate where a dot pattern is formed, and a thickness of the dot pattern is greater than the roughness of the surface of the substrate.

10. The electron emitting device as claimed in claim 9, wherein the electron-emitting part is formed at a density equal to or less than Ld/2 where Ld denotes a dot diameter when a single dot is formed when an electron-emitting part of the surface conduction electron-emitting element is formed by combining the dot patterns, and combination of which is made by arranging a plurality of dots in one line.

11. The electron emitting device as claimed in claim 9, wherein an electron-emitting part of the surface conduction electron-emitting element is formed by the combination of the dot patterns, and the dot pattern is electrically connected to the electrodes such that the dot pattern covers the electrodes with more than half dot of the dot pattern in the connection area of the dot pattern and the electrodes.

12. The electron emitting device as claimed in claim 9 or 11, wherein an electron-emitting part of the surface conduction electron-emitting element is formed by the combination of the dot patterns, and the dot pattern is electrically connected to the electrodes such that the thickness of the dot pattern in the connection area is thicker than the thickness of the dot pattern of the other area.

13. The electron emitting device as claimed in claim 11 or 12, wherein an electron-emitting part of the surface conduction electron-emitting element is formed by the combination of the dot patterns, and the dot pattern is electrically connected to the electrodes such that a plurality of the dot pattern are jetted and superimposed on a connection area of the dot pattern and the electrodes.

14. The electron emitting device as claimed in claim 9, wherein the electrode is formed by a rectangle

pattern or a combination of rectangle patterns, and a corner portion of the rectangle pattern is cut off.

15. The electron emitting device as claimed in claim 9, wherein the electrode is formed by a rectangle pattern or a combination of rectangle patterns, and a corner portion of the electrode that faces with another electrode is cut off.

16. The electron emitting device as claimed in claim 9, wherein the electrode is formed by a rectangle pattern or a combination of rectangle patterns, and a corner portion of the rectangle pattern is coated with the dot pattern.

17. The electron emitting device as claimed in

claim 9, wherein the electrode is formed by a rectangle pattern or a combination of rectangle patterns, and a corner portion of the electrode that faces with another electrode is coated with the dot pattern.

18. The electron emitting device as claimed in claim 9, wherein a plurality of the surface conduction electron-emitting elements are formed on the substrate as a device group with a matrix form, and a distance between the electrodes of each pair of the surface conduction electron-emitting elements is shorter than an arrangement pitch of the device group.

19. An image displaying apparatus, comprising:

an electron-emitting device that includes: a substrate; and a surface conduction electron-emitting element formed on the substrate by a conductive thin film, said conductive thin film is formed by jetting solution including a metal micro-particle material on the area between

the electrodes, which are formed on the substrate of the electron-emitting device, and vaporizing a volatile component in solution dot pattern after the droplet of solution is jetted on the substrate so that a solid content is remained on the substrate, and a diameter of the metal micro-particle in the solution is equal to or less than a roughness of a surface of the substrate where a dot pattern is formed, and a thickness of the dot pattern is greater than the roughness of the surface of the substrate; and

a face plate arranged to be facing the electron-emitting device, and said face plate mounting fluorescent material and having a shape and size substantially the same with that of the electron-emitting device substrate.